

## A REVISION OF WEBERBAUERA (BRASSICACEAE)

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Sixteen species of *Weberbaueria* are recognized, and the genera *Alpaminia*, *Pelagatia*, and *Stenodraba* are placed in the synonymy of *Weberbaueria*. *Weberbaueria cymosa*, *W. densifolia*, *W. minutipila*, *W. retropila*, and *W. smithii* are described as new. The new combinations *W. chillanensis*, *W. colchaguensis*, *W. herzogii*, *W. imbricatifolia*, *W. lagunae*, *W. parvifolia*, *W. stenophylla*, and *W. suffruticosa* are proposed.

Schulz (1924, 1936) placed *Weberbaueria* Gilg & Muschler (two species) and its closest South American relatives, *Alpaminia* O. E. Schulz (monotypic), *Pelagatia* O. E. Schulz (monotypic), and *Stenodraba* O. E. Schulz (six species), in subtribe Pachycladinae O. E. Schulz of the tribe Sisymbrieae DC. The subtribe, which consists of a heterogeneous assemblage of 15 genera, is artificially delimited and is based primarily on its having siliculose instead of siliquose fruits. All four genera above have siliquose fruits that are basically similar to those assigned by Schulz to other subtribes of the Sisymbrieae. A critical study of the whole tribe is needed before meaningful realignments of its genera on a broad scale can be proposed. However, progress is made in this direction in the following treatment of some of its South American members.

Schulz (1924, 1936) distinguished *Stenodraba* from *Alpaminia*, *Pelagatia*, and *Weberbaueria* solely by its ebracteate instead of bracteate inflorescences and then separated *Weberbaueria* from both *Alpaminia* and *Pelagatia* by its allegedly slender instead of flattened funicles. As argued by Macbride (1934), however, funicle thickness is insufficient grounds for delimitation of genera. In fact, it is an erroneous distinction. Almost all plants of *W. spathulaefolia* (A. Gray) O. E. Schulz (the type of *Weberbaueria*) that I have examined, including those annotated by Schulz, have flattened funicles indistinguishable from those of *Alpaminia* and *Pelagatia*. The last two genera are also very similar to *Weberbaueria* in habit, as well as in various aspects of the flower and fruit. A casual observer might argue that the occurrence in *Alpaminia* of malpighiaceae trichomes (see FIGURE 1a) and cymelike racemes is sufficient for the recognition of a distinct genus. But submalpighiaceae, sessile or short-stalked trichomes are found in *W. spathulaefolia* (see FIGURE 1b) and in *W. parvifolia* (Phil.) Al-Shehbaz, and cymelike racemes are also characteristic of *W. cymosa* Al-Shehbaz, a species not closely related to *Alpaminia*. Therefore, neither the nature of the trichomes nor the inflorescence type supports the separation of *Alpaminia* from *Weberbaueria*.

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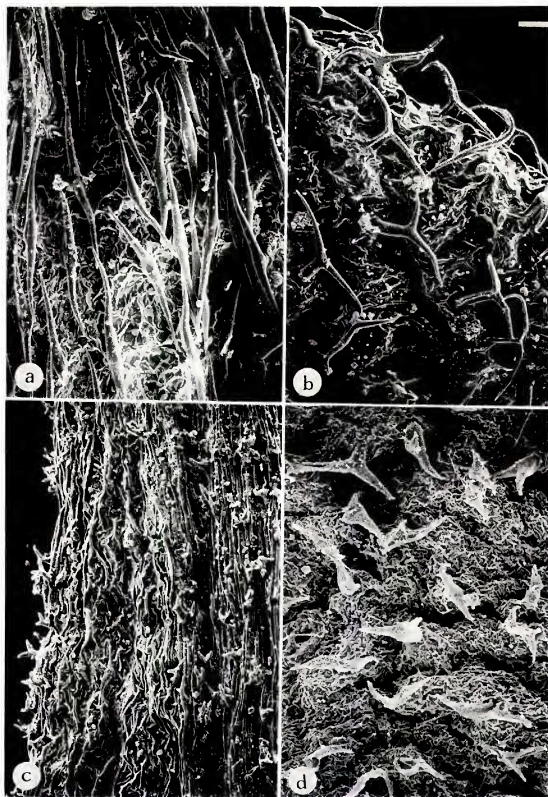


FIGURE 1. Leaf surfaces of *Weberbaueria*: a, *W. trichocarpa* (Macbride 3073, GH); b, *W. spathulifolia* (Smith, Valencia, & Torres 11845, GH); c, *W. minutipila* (holotype); d, *W. retropila* (holotype). Scale bar = 100  $\mu$ m.

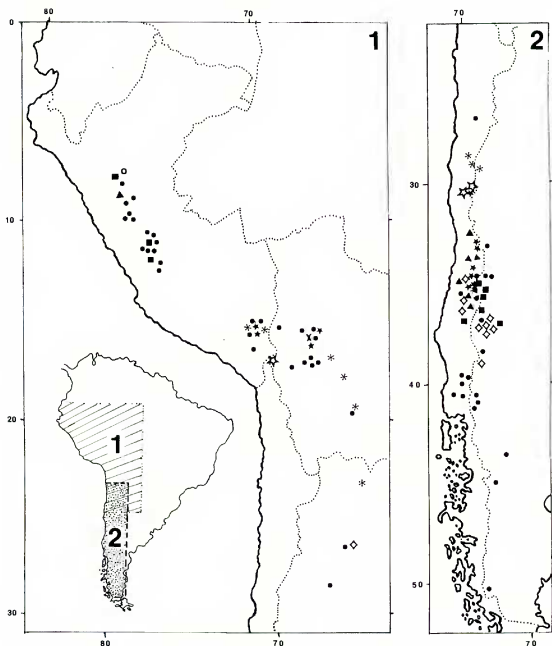
*Pelagatia* was not founded on well-observed characters, and its reduction by Macbride (1934, 1938) to synonymy of *Weberbaueria* is fully justified. *Pelagatia bracteata* O. E. Schulz, hereafter *W. bracteata* (O. E. Schulz) J. F. Macbr., belongs to a group of species that forms the core of *Weberbaueria*, and it appears to be a sister species of *W. herzogii* (O. E. Schulz) Al-Shehbaz.

Schulz's (1924, 1936) separation of *Stenodraba* from *Weberbaueria* on the basis of its having ebracteate instead of bracteate inflorescences is misleading and unreliable. The holotype of *W. spathulaefolia* consists of two plants, of which one has an ebracteate inflorescence and the other has only the lower half of the raceme bracteate. As is shown below, in *W. spathulaefolia* the portion of the inflorescence that is bracteate is highly variable, and a continuous variation from fully bracteate to completely ebracteate individuals can be found within the same population. Furthermore, numerous genera of the Brassicaceae (e.g., *Arabis* L., *Cardamine* L., *Draba* L., *Sisymbrium* L., *Streptanthus* Nutt.) include some species with ebracteate and others with bracteate inflorescences. In general, it is unsound to delimit genera in this family solely on the basis of presence vs. absence of bracts. *Stenodraba* is also indistinguishable palynologically from *Weberbaueria* (Al-Shehbaz, unpublished). Because there is not a single reliable character that separates *Stenodraba* from the earlier-published *Weberbaueria*, the two genera are here united.

Ravenna's (1981) transfer to *Stenodraba* of four species previously included in *Sisymbrium* requires careful evaluation. These species were placed in his newly created sect. *Elatia* Ravenna, which was distinguished from sect. *Stenodraba* in having erect stems and much-branched inflorescences instead of somewhat decumbent stems and unbranched inflorescences. In addition, sect. *Elatia* often has long, slender fruiting pedicels and subglobular floral buds. As I interpret it, no species of *Weberbaueria* (including *Stenodraba*) has any of these features. I disagree with Ravenna (1981) in assigning members of sect. *Elatia* to *Stenodraba*, because they are unrelated to any of the 16 species that fall naturally into *Weberbaueria*. A critical evaluation of the species assigned to this section reveals that all except one are better retained in *Sisymbrium*.

Although the limits of *Weberbaueria* are expanded here beyond those previously recognized, the genus is well defined and apparently monophyletic. However, as is the case in many other genera of the Brassicaceae, it is not possible in *Weberbaueria* to identify the shared derived characters (synapomorphies) that readily unite its members. Species of *Weberbaueria* are low, caespitose perennials with simple or branched caudices, well-developed rosettes, usually persistent petiolar bases, usually unbranched, subdecumbent stems, nonsaccate sepals, ringlike nectar glands that subtend the bases of all stamens, oblong to linear fruits, wingless seeds, incumbent cotyledons, and usually thickened funicle bases. None of these features is unique to *Weberbaueria*, but no other South American genus has this combination of characters.

*Weberbaueria* grows primarily along the Andes and is distributed from northern Peru south through western Bolivia, central Chile, and western Argentina into Patagonia (see MAPS 1, 2). The highest concentration of species is in Peru



MAPS 1, 2. Distribution of *Weberbaueria*: 1, *W. bracteata* (circle), *W. cymosa* (X), *W. densifolia* (diamond), *W. herzogii* (asterisks), *W. minutipila* (solid stars), *W. retropila* (hollow star), *W. smithii* (triangle), *W. spathulaefolia* (dots), and *W. trichocarpa* (squares); 2, *W. chillanensis* (squares), *W. colchaguensis* (dots), *W. imbricatifolia* (triangles), *W. lagunae* (asterisks), *W. parvifolia* (diamonds), *W. stenophylla* (solid stars), and *W. suffruticosa* (hollow stars).

and Chile, where eight and seven species grow, respectively. Except for *W. colchaguensis*, *W. herzogii*, and *W. spathulaefolia*, the other species of *Weberbaueria* either are highly localized endemics or are narrowly distributed.

Chromosome numbers are known only for *Weberbaueria spathulaefolia*, a

species reported to have  $2n = 52$  (Diers, 1961). Attempts to obtain mitotic counts from the root tips of a few species that I grew at Cambridge were unsuccessful.

*Weberbaueria* was originally described by Gilg & Muschler (1909) as a monotypic genus. Schulz (1924) was correct in reducing the name of its original type, *W. densiflora* (Muschler) Gilg & Muschler, to synonymy of the earlier-published *Sisymbrium spathulaefolium* A. Gray, which he transferred to *Weberbaueria*. Therefore, *W. spathulaefolia* (A. Gray) O. E. Schulz becomes the generic type.

The present study has included a critical examination of authentic material of almost all taxa. This has helped immensely in the interpretation of species and generic limits, as well as in the proper placement of synonyms. I have been very fortunate in this regard because such an opportunity was not available to others who have studied this group of plants.

#### TAXONOMY

**Weberbaueria** Gilg & Muschler, Bot. Jahrb. Syst. **42**: 481. 1909. TYPE: *W. densiflora* (Muschler) Gilg & Muschler = *W. spathulaefolia* (A. Gray) O. E. Schulz.

*Alpamina* O. E. Schulz, Pflanzenr. IV. **105**(Heft 86): 191. 1924. TYPE: *A. trichocarpa* (Muschler) O. E. Schulz.

*Pelagatia* O. E. Schulz, Pflanzenr. IV. **105**(Heft 86): 192. 1924. TYPE: *P. bracteata* O. E. Schulz.

*Stenodraba* O. E. Schulz, Pflanzenr. IV. **105**(Heft 86): 186. 1924. LECTOTYPE (designated by Ravenna, 1981): *S. chillanensis* (Philippi) O. E. Schulz.

Cespitose, perennial herbs; caudices simple or branched, usually covered with petiolar remains of previous years. Trichomes simple or furcate, rarely malpighiaceae. Stems few to several, usually subdecumbent, or decumbent, rarely ascending, unbranched, glabrous or pubescent. Basal leaves petiolate, usually forming well-defined rosettes that terminate caudex branches; blades entire or dentate, rarely pinnately lobed, often ciliate; petioles usually persistent; cauline leaves few or several, rarely lacking. Inflorescences few- to many-flowered, bracteate or ebracteate, corymbose racemes, rarely modified and cyme-like, usually elongated in fruit. Sepals caudaceous or rarely persistent, usually erect, oblong to ovate, nonsaccate, scarious at margin, glabrous or pubescent. Petals white, spatulate to oblong, usually attenuate into clawlike base. Nectar glands confluent, low, ringlike, subtending bases of all stamens. Stamens 6, slightly tetradynamous. Fruits dehiscent, oblong to linear, terete or somewhat flattened, smooth or rarely slightly torulose, usually with prominent midvein; septa hyaline, complete; styles conspicuous to obsolete; stigmas entire. Seeds uniseriately or rarely subseriately arranged in each locule, oblong, wingless; cotyledons incumbent; funicles thick or flattened at placental end, slender distally.

## KEY TO THE SPECIES OF WEBERBAUERA

- A. Plants, including fruits, densely covered with sessile, medifixed, malpighiaceus trichomes; petal claws often pubescent. . . . . 9. *W. trichocarpa*.
- A. Plants glabrous or pubescent with simple and/or stalked furcate trichomes; fruits glabrous or rarely sparsely pubescent with simple trichomes; petal claws glabrous.
- B. Inflorescences bracteate throughout.
- C. Basal leaves conspicuously ciliate with simple trichomes.
- D. Fruits attenuate, styles (0.8-)1.2-2.5 mm long; petals 3.5-5(-7) mm long; basal leaves entire or rarely dentate. . . . . 6. *W. herzogii*.
- D. Fruits obtuse, styles to 0.2 mm long; petals 2.5-3 mm long; basal leaves lyrate-pinnatifid. . . . . 7. *W. bracteata*.
- C. Basal leaves not ciliate, sometimes glabrous or with some furcate trichomes. . . . . 1. *W. spathulafolia*.
- B. Inflorescences ebracteate, with lowermost flowers rarely bracteate.
- E. Sepals persistent; fruits sparsely pubescent with retrorse, simple trichomes. . . . . 5. *W. retropila*.
- E. Sepals soon caducous; fruits glabrous.
- F. Basal leaves numerous; petioles persistent, straw colored, 3-3.5 cm long, about as long as blades, overlapping and forming dense crown. . . . . 2. *W. densifolia*.
- F. Basal leaves few to many; petioles soon caducous or if persistent, then not straw colored, usually less than 3 cm long, shorter than blades, not forming dense crown.
- G. Stems usually branched above; plants with some dendritic trichomes. . . . . 16. *W. parvifolia*.
- G. Stems usually unbranched above; plants without dendritic trichomes.
- H. Basal and cauline leaves ciliate with simple trichomes.
- I. Basal leaves pinnatifid, with 3 to 5 pairs of lateral lobes; inflorescences modified, 1- to 3-flowered, cymelike racemes; petals less than 2 mm long; caudices unbranched; stems less than 2 cm long. . . . . 8. *W. cymosa*.
- I. Basal leaves entire, rarely dentate or sinuately lobed; inflorescences usually many-flowered racemes; petals 2-5.5 mm long; caudices much branched; stems more than 2 cm long.
- J. Basal leaves semiterete, thick, linear. . . . . 14. *W. suffruticosa*.
- J. Basal leaves flat, thin, oblong to oblanceolate or spatulate, rarely linear-lanceolate.
- K. Styles obsolete or rarely up to 0.6 mm long in fruit.
- L. Fruits torulose; infructescences lax racemes; fruiting pedicels slender, divaricate, 4-8(-12) mm long; basal leaves entire, to 1.5 mm wide. . . . . 13. *W. lagunae*.
- L. Fruits smooth; infructescences usually dense, subumbellate; fruiting pedicels stout, subappressed, 1.5-4.5(-7) mm long; basal leaves usually dentate, 2-4.5(-6) mm wide. . . . . 10. *W. colchaguensis*.
- K. Styles 1-3 mm long in fruits, if shorter then fruits conspicuously flattened.
- M. Lower surfaces of basal leaves usually with trichomes shorter than those on margins or upper surfaces; fruits torulose; stems usually leafless; petioles of basal leaves stout, swollen. . . . . 15. *W. imbricatifolia*.

- M. Lower surfaces of basal leaves glabrous; fruits smooth; stems with few leaves; petioles of basal leaves slender, not swollen.
- N. Basal leaves entire; petals (3.5-)4-5 mm long; styles (0.8-)1.5-2 mm long in fruit. . . . . 12. *W. stenophylla*.
- N. Basal leaves dentate; petals 2.5-3.5 mm long; styles 0.5-0.9(-1.1) mm long in fruit. . . . . 11. *W. chillanensis*.
- H. Basal and cauline leaves not ciliate, sometimes glabrous or pubescent with at least some branched trichomes.
- O. Leaves fleshy, glabrous; petals 6.5-8 mm long; caudices thick, 1.5-2 cm in diameter. . . . . 4. *W. smithii*.
- O. Leaves not fleshy, often pubescent or rarely glabrous; petals 2-3.5(-4) mm long; caudices slender, almost always less than 1 cm in diameter.
- P. Trichomes minute, 0.03-0.1(-0.15) mm long; basal leaves filiform to narrowly linear; cauline leaves coarsely dentate-serrate. . . . . 3. *W. minutipila*.
- P. Trichomes coarser, (0.2-)0.4-0.7(-1.1) mm long; basal leaves oblong, ovate, lanceolate, or spatulate, very rarely linear; cauline leaves entire to repand or dentate. . . . . 1. *W. spathulaefolia*.

1. **Weberbaueria spathulaefolia** (A. Gray) O. E. Schulz, Pflanzenr. IV. **105**(Heft 86): 193. 1924.

*Sisymbrium spathulaefolium* A. Gray, U.S. Expl. Exped. Phan. **15**(1): 60. 1854. *Hesperis spathulaefolia* (A. Gray) Kuntze, Revis. Gen. Pl. **2**: 935. 1891. TYPE: Peru, [Junín.] Obrajillo, Wilkes Expedition, without collector's name (holotype, US 5526!; isotype, NY!).

*Arabis spathulata* Walp. in Meyen, Observ. Bot. **248**. 1843, non *A. spathulata* DC. Syst. Nat. **2**: 227. 1821, non Nutt. ex Torrey & A. Gray, Fl. N. Am. **1**: 81. 1838. TYPE: Peru, Altos de Toledo, *Meyen s.n.*, April 1831 (not seen).

*Sisymbrium orophilum* Wedd. Ann. Sci. Nat. Bot. V. **1**: 288. 1864. *Hesperis orophila* (Wedd.) Kuntze, Revis. Gen. Pl. **2**: 935. 1891. TYPE: Bolivia, Prov. Larecaja, vicinity of Sorata, near Anilaya, Juriguana, 4500 m alt., *Mandon 914 bis* (holotype, P!; isotypes, BM!, G!).

*Sisymbrium oliganthum* Wedd. Ann. Sci. Nat. Bot. V. **1**: 289. 1864. TYPE: Bolivia, rochers de La Laucha, Cordillera de La Paz, *Weddell s.n.*, 1851 (holotype, P!).

*Sisymbrium septaceum* Wedd. Ann. Sci. Nat. Bot. V. **1**: 289. 1864. TYPE: Bolivia, Potosí, *D'Orbigny 1447* (holotype, P! (photo, F!)).

*Braya densiflora* Muschler, Bot. Jahrb. Syst. **40**: 275. 1908. *Weberbaueria densiflora* (Muschler) Gilg & Muschler, Bot. Jahrb. Syst. **42**: 481. 1909. TYPE: Peru, Hacienda Arapa, Yauli, Lima-Oroya road, 4400 m alt., *Weberbauer 304* (lectotype (designated by Macbride, 1938), B!; isolectotype, G!).

*Weberbaueria spathulaefolia* (A. Gray) O. E. Schulz var. *integrifolia* O. E. Schulz, Publ. Field Mus. Nat. Hist. Bot. Ser. **8**: 80. 1930. TYPE: Peru, [Depto. Lima.] Río Blanco, in rocks, uplands, 8-19 May 1922, 15,000 ft [4572 m] alt., *Macbride & Featherstone 811* (holotype, F! (photos, F!, G!, GH!); isotype, GH!).

Caudices simple or sometimes branched, slender, less than 1 cm in diameter, usually covered with petiolar remains of previous years. Stems usually decumbent, unbranched, (2-)4-23(-43) cm long. Trichomes (0.2-)0.4-0.7(-1.1) mm

long, short stalked and submalpighiaceous, or long stalked and furcate, sometimes simple, rarely absent. Basal leaves petiolate; blades oblong or lanceolate to spatulate, rarely linear to ovate, (1-)2-6(-7) cm long, (2-)3-9(-11) mm wide, obtuse or rarely acute at apex, entire or repand to dentate, rarely lyrate-pinnatifid, thin and nonfleshy, pubescent or glabrous; petioles (0.5-)1-4.5 cm long. Cauline leaves subsessile to short petiolate; blades oblong to obovate or lanceolate, 5-13(-18) mm long, 2-8(-15) mm wide, entire to repand or dentate. Inflorescences bracteate to ebracteate; infructescences lax to compact, (0.5-)1-9(-17) cm long. Sepals caducous; oblong to ovate, (1.5)2-2.5(-3) mm long, 1-1.4(-1.7) mm wide, obtuse, scarios at margin, sparsely pubescent to glabrous. Petals white, spatulate, attenuate to clawlike base, 2-3.5(-4) mm long, 1.5-1.8(-2) mm wide. Filaments white, erect, 1.5-2.5 mm long, somewhat dilated at base; anthers oblong to ovate, 0.4-0.7 mm long. Fruiting pedicels ascending, subappressed at base, straight to curved, (2-)3-6(-8) mm long. Fruits divaricate to erect and subappressed to rachis, linear to oblong, terete, non-torulose, usually abruptly ending in style, straight or rarely curved, (6-)8-15(-20) mm long, 1.5-1.8(-2) mm wide; valves smooth, glabrous, conspicuously to obscurely veined; septa hyaline; styles 0.2-0.8(-1.5) mm long; stigmas entire. Seeds subbiserially arranged, oblong to ovate, (0.8-)1-1.4 mm long, (0.5-)0.6-0.8 mm wide, light to dark brown; funicles usually strongly differentiated into persistent broad base and filiform distal portion.

Flowering late December to mid-February, fruiting late February to mid-May. Growing on sand or clay in puna-grassland, boggy areas, valley bottoms, calcareous cliffs, dry steep slopes, and rocky places at altitudes of 3600-4800 m.

REPRESENTATIVE SPECIMENS EXAMINED. **Argentina.** PROV. CATAMARCA: Depto. Andalgala, Cerro Yutuyaco, *Sleumer 2721* (LIL); Río Potrero, *Sleumer 1905* (B). PROV. JUJUY: Depto. Humahuaca, Mina Aguilar, *Sleumer 3402* (LIL). PROV. LA RIOJA: Sierra Famatina, Cueva de Pérez, *Hieronimus & Niederlein 376* (B). **Bolivia.** DEPTO. LA PAZ: Prov. Aroma, Huaraco Pendiente, *Fisel U-188* (GH), *U-472* (LPB); Prov. Larecaja, vicinity of Combaya, *Mandon 914* (BM, G, P); Prov. Murillo, La Cumbre, on road to Unduavi, *Solomon 5029* (MO); ca. 15 km NNE of La Paz, *Beck 9130* (GH); 17 km SE of Collana on La Paz-Calacoto road, *Beck 4290* (GH); Prov. Pacajes, Charaña, *Asplund 2664* (s, UPS), *6201* (US); Corocoro, *Asplund 2418* (s, UPS); Panacachi, *Asplund 2582* (s). DEPTO. POTOSÍ: Prov. Frías, Cerro Potosí, *Petersen & Hjerting 1030* (c, LIL), *Cárdenas 398* (US). **Peru.** DEPTO. ANCASH: Prov. Bolognesi, between Tallenga and Pachapaque, *Cerrate 749* (GH); Prov. Carhuás, Huascarán National Park [HNP], Quebrada Ishinca, *Smith, Valencia, & Gonzales 9440* (MO); Prov. Huarás, HNP, Quebrada Shallap, *Smith, Valencia, & Gonzales 9670* (MO); Prov. Huaylas, HNP, Quebrada Los Cedros, *Smith, Valencia, & Minaya 9924* (GH, MO); Prov. Recuay, HNP, pass between Nevado Pasto Ruri and Nevado Rarí, *Smith & Escalona 10182* (MO); Quebrada Quena Ragra, *Smith, Valencia, & Torres 11730* (MO); Quebrada Quchshque, *Smith, Valencia, & Torres 11845* (GH, MO); Río Pachacoto drainage, 15 mi from highway, *Smith, Stein, & Todzia 9373* (GH, MO). DEPTO. HUANCAYELICA: Prov. Huancavelica, Bunbunya, *Tovar 219* (GH). DEPTO. JUNÍN: between Cerro de Pasco and La Quinua, *Asplund 11871* (s); Morococha, *Haapala s.n.*, 15 Feb. 1949 (H); Ondores, *Pattersson 293* (s); vicinity of Oroya, *Kalenborn 132* (GH, NY), *132a* (US); between Tarma and La Oroya, *Weberbauer 2550* (B). DEPTO. LIMA: Río Blanco, *Macbride 2991* (F, NY); Saltacuna, *Soukup 1940* (US); Ticlio Bajo, *Diers 979* (GH); Visco, *Macbride & Featherstone 590* (F, G, NY); Prov. Huarochiri, Casapalca, *Asplund 11425* (s); Prov.



Yauyos, Huacrococha, 17 km to Tupe, *Cerrate* 1226 (GH). DEPTO. MOQUEGUA: PROV. Moquegua, cordillera above Torata, *Weberbauer* 7471 (BM, F, G, US). DEPTO. PASCO: PROV. Cerro, Cerro de Pasco, *Asplund* 11779 (S), *Macbride* 3065 (CAS, F, US). DEPTO. PUNO: PROV. Carabaya, Antapampa, *Vargas* 6837 (F).

*Weberbaueria spathulaefolia* is one of the most variable South American crucifers. The variation is most noticeable in length of infructescences, occurrence of bracts, type and density of trichomes, and shape and margin of leaves. The infructescences are usually racemes a few to several centimeters in length, but in *Asplund* 11779 they are subumbellate and only 0.5 cm long, and in *Cerrate* 749 they are lax and to 17 cm. Perhaps the most significant variation is in the length of the bracteate portion of the inflorescence. In many populations the inflorescences are either bracteate throughout or ebracteate, while in others only the lowermost portion of the racemes are bracteate. In some collections (c.g., *Asplund* 2418, *Macbride* 2991) both ebracteate and bracteate plants are found within the same population. As indicated above, the holotype of *W. spathulaefolia* has two plants; the raceme of one plant is ebracteate, while that of the other is bracteate only on the lower half. Evidently, the occurrence of bracts is not a good character for the generic delimitation of *Weberbaueria*.

Stem and leaf pubescence of *Weberbaueria spathulaefolia* is also highly variable. Glabrescent forms, as well as forms with simple or asymmetrically furcate trichomes, are widespread in specimens from throughout the range of the species. In contrast, plants with submalpighiaceous trichomes are apparently more common in the northern portions of the species range than elsewhere. However, in the majority of collections more than one trichome type is found, and in some (e.g., *Mandon* 914) both glabrous and densely pubescent plants are present.

Variation in the length of infructescences, the occurrence of bracts, and the pubescence of stems and leaves does not correlate with the geography of *Weberbaueria spathulaefolia*. The species cannot be subdivided morphologically into practical subordinate taxa.

## 2. *Weberbaueria densifolia* Al-Shehbaz, sp. nov.

FIGURE 2.

Herba perennis caespitosa, radicibus longibus crassibus. Folia basales numerosa, petiolata, rosulata, petiolis persistentibus, rectibus, stramineis, 3–3.5 cm longis; lamina pinnatifida vel sinuata vel repando-dentata, 2–3 cm longa, 4–6 mm lata; folia caulina pauca, petiolata, repanda vel integra, 8–11 mm longa. Flores ingotis. Pedicelli fructiferi subappressi, recti, 3–5 mm longi. Siliqua anguste oblonga, glabra, subtorulosa, paucisperma, 5–6 mm longa, 1.2–1.4 mm lata. Semina oblonga, uniseriata, ca. 1.3 × 0.7 mm longa; cotyledones incumbentes.

Deep-rooted, caespitose perennial. Main roots thick, more than 15 cm long, 3–5 mm wide. Caudices short; stems decumbent, 4–6 cm long, glabrous. Basal leaves numerous, rosulate, petiolate; blades lanceolate, 2–3 cm long, 4–6 mm wide, obtuse to subacute at apex, attenuate at base, pinnatifid to sinuate or repand-dentate, pubescent with straight, simple or asymmetrically furcate trichomes 0.2–0.4 mm long; petioles persistent, erect to spreading, densely over-

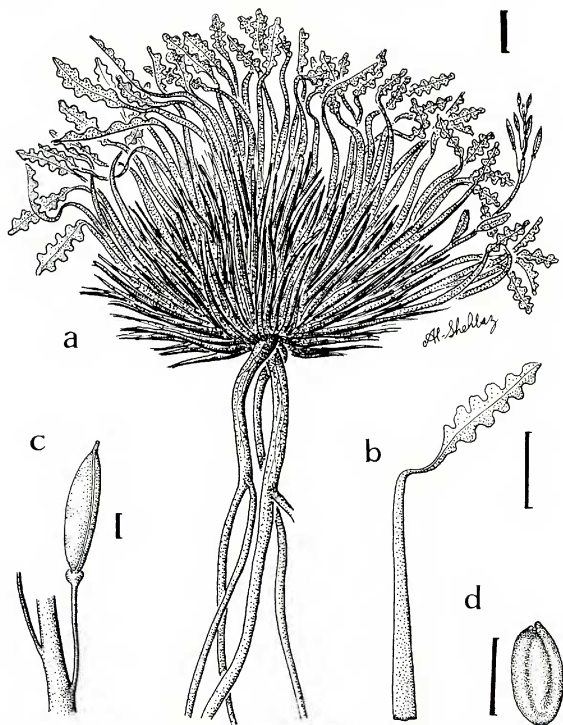


FIGURE 2. *Weberbaueria densifolia* (holotype): a, plant; b, basal leaf; c, portion of inflorescence with fruit; d, seed. Scale bars = 1 cm (a, b), 1 mm (c, d).

lapping, straight, 3–3.5 cm long, 2–3 mm wide, straw colored and becoming papery with age, glabrous. Cauline leaves few, petiolate; blades 8–11 mm long, 4–6 mm wide, repand to entire. Flowers not seen. Inflorescences ebracteate, glabrous; fruiting pedicels erect to only slightly ascending, subappressed, straight, 3–5 mm long. Fruits narrowly oblong, subtorulose, 5–6 mm long, 1.2–1.4 mm wide, glabrous, few seeded; septa complete, membranaceous; styles 0.5–0.7

mm long. Seeds uniseriately arranged, oblong, ca. 1.3 mm long, 0.7 mm wide, obscurely reticulate; cotyledons incumbent.

TYPE. Argentina, Prov. Catamarca, Depto. Santa María, Sierra del Aconquija, 4600 m alt., 20 Feb. 1925, *S. Venturi 6610* (holotype, us (photocopy, GH)).

*Weberbaueria densifolia* is easily distinguished from the other species of the genus by its numerous, densely overlapping leaves with persistent, straight, straw-colored petioles 3–3.5 cm long and about as long as the leaf blade. Other species of *Weberbaueria* have few petioles that are much shorter than the blades and that do not form dense crowns. Furthermore, *W. densifolia* is also unique in the genus in having deeply penetrating, thick, few-branched main roots that are more than 15 cm long.

*Weberbaueria densifolia* superficially resembles *W. spathulaefolia* in several aspects of leaf blade and fruit morphology. The two are apparently related, but such a relationship cannot be fully assessed without adequate material of the former.

### 3. *Weberbaueria minutipila* Al-Shehbaz, sp. nov.

FIGURE 3.

Herba perennis tenella, caudicibus tenuibus, caulibus decumbentibus 2–7 cm longis, sparse vel dense pubescentibus, pilis minute furcatis vel simplicibus 0.03–0.1(–0.13) mm longis. Folia basales petiolata filiformes vel anguste lineares, integra vel sparse dentata, longitudinaliter plicata vel plana (1–)2–3(–4.5) cm longa; petiolis complanatis ad basim expansis persistentibus; folia caulina ovata vel lanceolata dentato-serrata subsessilia (3–)4–8(–10) mm longa. Racemi ebracteati. Sepala erecta oblonga 1.5–2 mm longa; petala spatulata alba 2–2.7 mm longa. Pedicelli fructiferi recti subappressi 2.5–3.5(–5) mm longi. Siliqua anguste oblonga glabra subtorulosa 6–9 mm longa; stylus 0.2–0.3 mm longus. Semina uniseriata ovata 3 vel 4 in loculo.

Delicate perennial herbs. Caudices simple, slender, covered with petiolar bases of previous years. Stems decumbent to rarely ascending, simple, 2–7 cm long, sparsely to densely covered with minute, furcate or simple trichomes 0.03–0.1(–0.13) mm long, sometimes glabrescent. Basal leaves petiolate; blades filiform to narrowly linear, rarely linear-lanceolate, (1–)2–3(–4.5) cm long, 0.5–1.5(–2.5) mm wide, acute at apex, entire or rarely dentate, longitudinally plicate to flat, pubescent to glabrescent; petioles persistent, (3–)5–8(–10) mm long, flattened, conspicuously expanded at base, straw colored, glabrous. Cauline leaves short petiolate to subsessile; blades ovate to lanceolate, (3–)4–8(–10) mm long, 1.5–3.5(–5) mm wide, dentate-serrate or rarely sublaciniate. Inflorescences ebracteate racemes, slightly elongated in fruit. Sepals caducous, erect, oblong, 1.5–2 mm long, 0.7–1 mm wide, rounded at apex, nonsaccate, narrowly scarious at margin, drying lavender, glabrous or only sparsely pubescent below apex. Petals white, spatulate, 2–2.7 mm long, 1–1.2 mm wide, rounded at apex, attenuate to clawlike base. Nectar glands obscure, ringlike, subtending bases of filaments. Filaments white, erect, 1.1–1.5 mm long; anthers oblong, 0.4–0.5 mm long. Fruiting pedicels somewhat ascending, subappressed to rachis, straight, 2.5–3.5(–5) mm long, glabrous. Fruits narrowly oblong, subtorulose, 6–9 mm

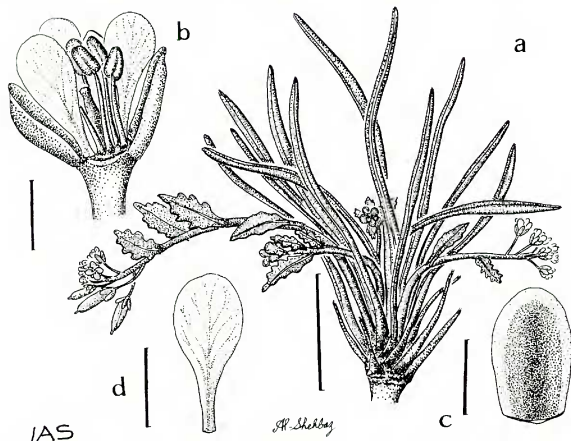


FIGURE 3. *Weberbaueria minutipila* (holotype): a, plant; b, flower with 1 sepal and 1 petal removed; c, sepal; d, petal. Scale bars = 1 cm (a), 1 mm (b-d).

long, ca. 1 mm wide, glabrous; styles 0.2–0.3 mm long. Seeds 3 or 4 per locule, uniseriately arranged, ovate, ca. 1 mm long, 0.7 mm wide, brown; cotyledons incumbent; funicles slightly expanded at placental end.

**TYPE.** Peru, Depto. Puno, Prov. San Román, "shale barren" with rock-chip covered bare ground, on bare hills on Puno–Arequipa road at km 112.8, ca. 4 km (air) E of Tinocopalca (km 119.5), ca. 10 km W of road-turnoff to Sta. Lucía (at km 101), ca. 4000 m alt., 12 Jan. 1963, *H. H. & C. M. Iltis and D. & V. Ugent 1455* (holotype, GH; isotype, wis).

**ADDITIONAL SPECIMENS EXAMINED.** **Peru.** DEPTO. AREQUIPA: Prov. Arequipa, S of Sta. Lucía on road from Puno to Arequipa, ca. 4–5 km E of Sta. Lucía, *Iltis & Ugent 1415* (wis). **Bolivia.** DEPTO. LA PAZ: Prov. Murillo, 14 km N of La Paz, Mina Milluni, 15 km hacia Tuni Condoriri, *Beck 3832* (GH); Valle Chuquiaguillo, *Asplund 1888* (s).

*Weberbaueria minutipila* is distinguished from the other species of the genus in having minute trichomes rarely to 0.13 mm long (see FIGURE 1c), filiform to linear basal leaves 0.5–1.5(–2.5) mm wide, usually coarsely dentate-serrate, ovate to lanceolate cauline leaves, and ebracteate inflorescences.

Both *Weberbaueria minutipila* and *W. spathulacifolia* grow in Prov. Murillo, Bolivia. It is not known, however, if the two species grow sympatrically.



FIGURE 4. *Weberbaueria smithii* (holotype): a, plant; b, flower; c, petal; d, stamen. Scale bars = 1 cm (a), 1 mm (b-d).

4. *Weberbaueria smithii* Al-Shehbaz, sp. nov.

FIGURE 4.

Herba glabra perennis caespitosa, caudicibus lignosis crassis 1.5–2 cm latis, caulibus decumbentibus 4–7 cm longis. Folia basales rosulata, late spatulata, succulenta, glabra, integra, apice obtusa, base attenuata, 2–4.5 cm longa, 0.6–1.3 cm lata. Racemi ebracteati. Sepala erecta, oblonga, glabra, decidua, 4.2–5.5 mm longa, 2.2–2.6 mm lata; petala alba, late spatulata, 6.5–8 mm longa, 2.8–3 mm lata. Pedicelli fructiferi, recti, 6–10 mm longi, divaricati-adscendentes. Siliqua oblonga vel linearis, obtusa 0.5–1.5 cm longa, 1.5–2 mm lata, valvis crassis, glabris; stylus 1–1.5 mm longus. Semina matura ignota.

Perennial, glabrous, caespitose herbs with unbranched, thick, woody caudices 1.5–2 cm in diameter. Stems few, decumbent, 4–7 cm long. Basal leaves rosulate, fleshy; blades broadly spatulate, 2–4.5 cm long, 6–13 mm wide, obtuse, attenuate at base, entire, nonciliate, glabrous; petioles thick, 1–2.5 cm long. Cauline leaves sessile; blades oblanceolate, 1–1.8 cm long, 3–5 mm wide, subacute, attenuate to broad base, entire, glabrous or with few, simple, subapical trichomes. Inflorescences ebracteate racemes, elongated in fruit. Sepals caducous, erect, oblong, 4.2–5.5 mm long, 2.2–2.6 mm wide, obtuse, nonsaccate, narrowly scarious at margin, glabrous. Petals creamy white, broadly spatulate, 6.5–8 mm long, 2.8–3 mm wide, rounded at apex, attenuate to broad, clawlike base. Nectar glands confluent, low, ringlike, subtending bases of filaments. Stamens slightly tetradynamous; filaments white, erect, slender, 3.5–4 mm long;

anthers oblong, 1–2 mm long. Fruiting pedicels divaricate-ascending, straight, 6–10 mm long. Fruits oblong to linear, 0.5–1.5 cm long, 1.5–2 mm wide, obtuse at apex, abruptly ending in style; valves thick, glabrous, with obscure midvein; styles 1–1.5 mm long. Mature seeds not seen.

Growing in cracks of exposed rocks or among rock outcrops in grasslands and margins of bare needle-ice zones at altitudes of 4770–4870 m.

TYPE. Peru, Depto. Ancash, Prov. Yungay, Huascarán National Park, Llanganuco Sector, Quebrada Ancosh at Portachuelo (77°35'W, 9°03'S), 31 Dec. 1984, *D. N. Smith & K. Goodwin 8894* (holotype, MO).

ADDITIONAL SPECIMEN EXAMINED. **Peru:** Same as type locality, *Smith 11298A* (MO).

*Weberbaueria smithii*, named after one of its collectors, is easily distinguished from the remainder of the genus by its fleshy, glabrous leaves, thick, unbranched caudices, considerably larger flowers with petals 6.5–8 mm long, and rounded fruit apices abruptly ending in a distinct style.

Nothing can be said about the variability of this handsome species because only two plants were available for study. Field notes of the two collections above indicate that the species has purple petioles, sepals, and young fruits.

##### 5. *Weberbaueria retropila* Al-Shehbaz, sp. nov.

FIGURE 5.

Herba perennis, caudicibus tenuibus ca. 2 mm latis, caulibus simplicibus adscendentibus vel subdecumbentibus, 2.5–5.5 cm longi. Folia basales haud rosulata, petiolata, late spatulata vel oblanceolata, dentata, 1.3–2.5 cm longa, 4–7 mm lata, sparse pubescentibus, pilis furcatis. Racemi ebracteati. Sepala erecta, oblonga, persistens, purpurea, 2–2.5 mm longa, 1–1.2 mm lata. Petala alba, spatulata, attenuata, 3–3.5 mm longa, 1–1.5 mm lata. Pedicelli fructiferi 2–3.5(–6) mm longi. Siliqua oblonga, subacuta, 5–8(–10) mm longa, 1.5–1.8 mm lata, valvis sparse pubescentibus pilis retrorsis simplicibus 0.1–0.25 mm longis; stylus 0.5–0.8 mm longus. Semina uniseriata ovata 1.4–1.5 mm longa.

Perennial herbs with slender rootstocks ca. 2 mm wide. Stems ascending to subdecumbent, simple, 2.5–5.5 cm long, glabrous. Basal leaves not rosulate, petiolate, caducous, often spatulate to oblanceolate, 1.3–2.5 cm long, 4–7 mm wide, dentate, sparsely pubescent with stalked, Y- or T-shaped furcate trichomes; petioles to 1 cm long. Cauline leaves similar to basal ones but smaller. Inflorescences ebracteate racemes, slightly elongated in fruit. Sepals persistent, erect, oblong, 2–2.5 mm long, 1–1.2 mm wide, obtuse at apex, membranaceous at margin, purplish, glabrous or rarely with few subapical trichomes. Petals white, spatulate, 3–3.5 mm long, 1–1.5 mm wide, attenuate to short, clawlike base. Nectar glands ringlike, poorly developed outside bases of filaments. Filaments white, erect, slender, 1.5–1.8 mm long; anthers ovate, 0.4–0.5 mm long, apiculate. Fruiting pedicels ascending, straight, 2–3.5(–6) mm long, glabrous. Fruits narrowly oblong, slightly torulose, 5–8(–10) mm long, 1.5–1.8 mm wide, subacute at apex; valves sparsely pubescent with simple, retrorse trichomes 0.1–0.25 mm long, midvein inconspicuous; septa hyaline, complete; styles 0.5–0.8 mm long; stigmas entire. Seeds usually 3 or 4 per locule, uniseriately

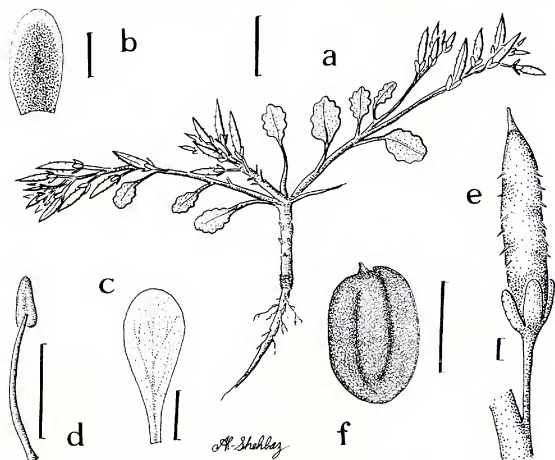


FIGURE 5. *Weberbaueria retropila* (holotype): a, plant; b, sepal; c, petal; d, stamen; e, fruit and fruiting pedicel; f, seed. Scale bars = 1 cm (a), 1 mm (b-f).

arranged, ovate, 1.4–1.5 mm long, 0.9–1 mm wide, dark brown; funicles slightly expanded proximally, slender distally; cotyledons incumbent.

TYPE. Bolivia, Depto. La Paz, Prov. Pacajes, Charaña, 4000 m alt., *Asplund s.n.*, 2 March 1921 (holotype, us).

ADDITIONAL SPECIMEN EXAMINED. **Bolivia:** same as type locality, ca. 4050 m alt., *Asplund* 2700 (s).

Despite the altitudinal differences between the two collections cited above, it is likely that both were made from the same population. Comparisons of *Asplund*'s collections of several other species show that labels of his duplicates at us usually differ from those of the original set at s in only a few minor details. Therefore, the specimen above at s might well be an isotype.

*Weberbaueria retropila* is easily distinguished in having pubescent fruits with retrorse simple trichomes, persistent calyces, slender rootstocks, fewer (three or four) seeds per locule, and sparsely pubescent leaves with Y- or T-shaped, furcate trichomes (see FIGURE 1d). Because the rootstocks are very slender and the basal leaves are caducous, the species could easily be mistaken for an annual. This aspect of habit and the presence of persistent sepals make *W. retropila*

somewhat anomalous in the genus. However, all other features of the species are characteristic of *Weberbaueria*.

6. *Weberbaueria herzogii* (O. E. Schulz) Al-Shehbaz, comb. nov.

*Sarcodraba herzogii* O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 10: 563. 1929.

TYPE: Bolivia, auf erde zwischen Felsplatten der Hügel über dem Titicacasee bei Guaqui, ca. 3900 m, *T. Herzog 2510* (holotype, B! (photos, F!, GH!, MO!, NY!); isotypes, G! (photos, F!, MO!), Z!).

Caudices slender, simple or rarely few branched. Stems decumbent to erect, unbranched, (1.5-)3-12 cm long, hirsute with spreading to reflexed simple trichomes 0.4-1 mm long, rarely glabrous or glabrescent. Basal leaves petiolate; blades broadly obovate to spatulate, (1-)1.5-3.5 cm long, (4-)5-10 mm wide, rounded at apex, entire to repand or rarely dentate, usually ciliate; petioles ciliate, (0.5-)0.7-2 cm long. Cauline leaves 0.3-1.1(-2) cm long, 2-5(-10) mm wide, dentate to repand or entire. Inflorescences bracteate racemes, elongated or rarely unexpanded in fruit; bracts 3-toothed to entire. Sepals caducous, oblong to ovate, (2.2-)3-4 mm long, 1.5-2 mm wide, obtuse, scarious at margin, glabrous to sparsely hirsute. Petals white to lavender, spatulate to broadly obovate, 3.5-5(-7) mm long, 1.5-2.5 mm wide. Filaments white, erect, slender, 2.2-4 mm long; anthers oblong, 0.6-0.9 mm long. Fruiting pedicels ascending to divaricate, usually straight, (3-)4-10 mm long. Fruits linear to oblong, terete, nontorulose, (5-)8-18 mm long, 1.6-2.1 mm wide, usually attenuate to slender style; valves glabrous, with prominent to obscure midvein; septa hyaline; styles slender, (0.8-)1.2-2.5 mm long; receptacles 4-angled, usually expanded. Seeds uniseriately arranged, oblong, 1.5-1.8 mm long, 0.8-1 mm wide, light brown; funicles strongly differentiated into broad, persistent base and filiform distal portion.

Flowering early December through February; growing at altitudes of 3125-4700 m.

REPRESENTATIVE SPECIMENS EXAMINED. **Argentina.** PROV. JUJUY: Depto. Humahuaca, Esquinas Blancas, between Tres Cruces and Humahuaca, *Ruthsatz 13/18* (GH). **Bolivia.** DEPTO. LA PAZ: 5 km E of Villa Santa Fe (ca. 100 km N of Oruro), *Conrad 2692* (MO); 2 km W of Villa Santa Fe, *Conrad 2709* (MO); Prov. Ingavi, Guaqui, *Asplund 2226* (S). DEPTO. POTOSÍ: Orocoro, near Ventilla, *Ceballos, Charpin, Fernández Casas, & Valdés-Bermejo 252* (G); Potosí, *Cárdenas 173* (GH), *399* (US); Miraflores, *D'Orbigny 1347* (P). **Peru.** Depto. Puno, Puno, *Shepard 38* (GH, US), *Soukup 106* (F); Santa Lucía, *Sharpe 143* (F); without further locality, *Gay 2256* (P).

*Weberbaueria herzogii*, which is often confused with *W. spathulaefolia*, is easily distinguished by its ciliate basal leaves, exclusively simple trichomes, inflorescences bracteate along their entire length, large (1.5-1.8 mm) seeds, and attenuate fruits that terminate in slender styles (0.8-)1.2-2.5 mm long. The closely related *W. spathulaefolia* has nonciliate leaves, furcate trichomes sometimes mixed with simple ones (or the plant is glabrous), ebracteate or partially bracteate (rarely completely bracteate) inflorescences, smaller ((0.8-)1-1.4 mm long) seeds, and usually blunt fruits with styles almost always less than 1 mm long.



Both *Weberbaueria herzogii* and *W. spathulaefolia* grow in Depto. Potosí, Bolivia. *Cárdenas 399*, cited under the former species, and *Cárdenas 398*, cited under the latter, were probably collected from the same general area. It is not known, however, if the two species are actually sympatric.

In a few collections (e.g., *Cárdenas 173, 399*) the rachises of the central infructescences do not elongate, and the fruits appear as if borne on short scapes. However, this abnormality is insignificant because it is found within certain collections (e.g., *Ceballos et al. 252*) that otherwise have normal infructescences.

The placement of *Weberbaueria herzogii* in *Sarcodraba* by Schulz (1929) was not based on a careful evaluation of the boundaries of these genera. Schulz (1924, 1936) stated that *Sarcodraba* differs from *Weberbaueria* mainly in having silicles instead of siliques. Apparently, he did not examine any fruiting material of *W. herzogii*. The species is so closely related to *W. spathulaefolia* that the two have probably evolved from a common ancestor.

#### 7. *Weberbaueria bracteata* (O. E. Schulz) J. F. Macbr. *Candollea* 5: 356. 1934.

*Pelagatia bracteata* O. E. Schulz, *Pflanzenr.* IV. 105(Heft 86): 192. 1924. TYPE: Peru, Depto. Ancash, Prov. Pallasca, Cordillera of Pelagatos, 4600 m alt., 23 Jan. 1920, A. Weberbauer 7234 (holotype, B! (photos, F!, GH!, MO!, NY!); isotypes, F(2 sheets)!, G!).

Small, caespitose perennials. Caudices simple, thick, 6–12 mm wide. Stems decumbent, 3–6 cm long, glabrous. Basal leaves rosulate, petiolate; blades oblanceolate to spatulate, 1.5–4 cm long, 4–9 mm wide, lyrate-pinnatifid, with 2 to 4 lateral lobes, rarely repand or entire, ciliate with simple, straight trichomes 0.3–0.9 mm long, glabrous on both surfaces or sometimes pubescent on upper. Cauline leaves petiolate; blades obovate to spatulate, 7–13 mm long, 2–4.5 mm wide, gradually reduced in size upward, rounded at apex, entire or rarely repand, ciliate. Inflorescences corymbose racemes, bracteate throughout, elongated in fruit. Sepals caducous, erect, oblong to ovate, 1.5–2.2 mm long, 1–1.1 mm wide, rounded at apex, nonsaccate at base, membranaceous at margin, glabrous. Petals white, spatulate, 2.5–3 mm long, to 1 mm wide, rounded at apex, attenuate to clawlike base. Filaments white, erect, 1.5–2 mm long; anthers oblong, 0.6–0.7 mm long. Fruiting pedicels 3–7 mm long. Fruits ascending, oblong, terete, straight, nontorulose, 6–9 mm long, 1.5–2 mm wide, obtuse at apex; valves glabrous, with conspicuous midvein; styles to 0.2 mm long. Seeds 3 to 5 per locule, uniseriately arranged, oblong, 1.4–1.6 mm long, 0.6–0.7 mm wide, brown; funicles broad at proximal end.

*Weberbaueria bracteata* is known only from the type collection. It is most closely related to *W. herzogii*, from which it is distinguished in having glabrous stems, lyrate pinnatifid basal leaves, small petals to 3 mm long, obtuse fruits, and minute styles to 0.2 mm long. *Weberbaueria herzogii* usually has retrorsely pubescent stems, entire to dentate basal leaves, larger (3.5–5(–7) mm long) petals, attenuate fruits, and conspicuous styles (0.8–)1.2–2.5 mm long. The differences between *W. bracteata* and the closely related *W. cymosa* are given under the latter.

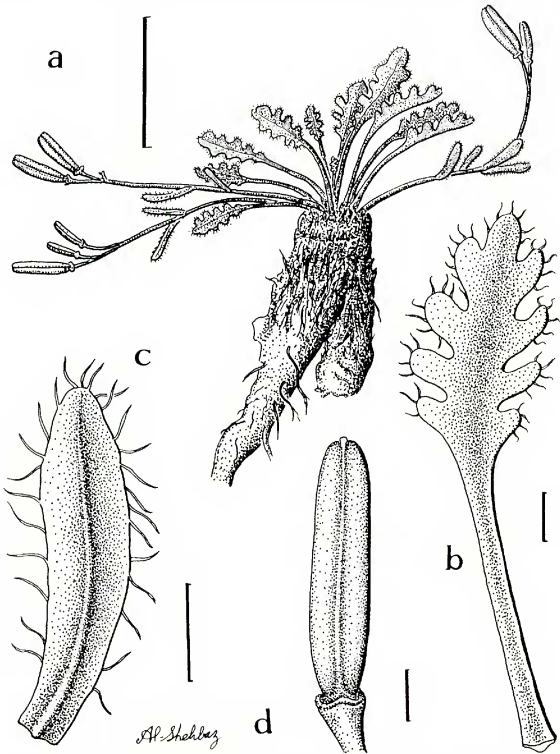


FIGURE 6. *Weberbaueria cymosa*: a, plant; b, basal leaf; c, cauline leaf; d, fruit. Scale bars = 1 cm (a), 1 mm (b-d).

As indicated above, Schulz's (1924, 1936) placement of *Weberbaueria bracteata* in the monotypic *Pelagatia* is not supported by any morphological evidence. His allegation (1924; see key, p. 181) that *Pelagatia* differs from *Weberbaueria* in having flattened instead of slender funicles is erroneous because

almost all plants that I have examined of *W. spathulaefolia*, the generic type, have flattened funicles.

8. *Weberbaueria cymosa* Al-Shehbaz, sp. nov.

FIGURE 6.

Herba caespitosa perennis tenella, caudicibus crassis, caulibus decumbentibus, glabris, tenuibus, 1–1.7 cm longis. Folia basales petiolata, pinnatifida, rosulata, 5–15 mm longa, 2–3 mm lata, lobis lateralibus 3- vel 5-jugis, oblongis vel ovatis, ciliatis, 0.8–1.2 mm longis, 0.4–0.6 mm latis; folia caulina anguste oblonga, sessiles, ciliata, integra, 2.5–4 mm longa. Inflorescentia ebracteata, 2- vel 3-floribus, dichasium plus minusve faciens. Sepala oblonga, erecta, non-saccata, glabra, 1.4–1.6 mm longa. Petala alba, spathulata, ca. 1.4 mm longa. Pedicelli fructiferi recti 2.5–5 mm longi. Siliqua oblonga, obtusa, glabra, 4–5.5 mm longa; stylus obsoletus usque ad 0.3 mm longus. Semina immatura uniseriata, ovata, ca. 1.2 × 0.7 mm, funiculis filiformibus.

Small, caespitose perennials. Caudices simple, thick, 4–6 mm wide. Stems decumbent, slender, 1–1.7 cm long, glabrous. Basal leaves rosulate, petiolate; blades ovate to lanceolate, 5–15 mm long, 2–3 mm wide, pinnatifid, the lateral lobes in 3 to 5 pairs, oblong to ovate, 0.8–1.2 mm long, 0.4–0.6 mm wide, obtuse, ciliate with simple trichomes 0.3–0.5 mm long; petioles 3–8 mm long, glabrous. Cauline leaves few, sessile; blades narrowly oblong, 2.5–4 mm long, 0.8–1.3 mm wide, obtuse to rounded, entire, ciliate. Inflorescences ebracteate, highly modified, dichasiumlike or 2- or 1-flowered racemes. Sepals erect, oblong, 1.4–1.6 mm long, ca. 0.7 mm wide, rounded at apex, glabrous. Petals white, spatulate, ca. 1.4 mm long. Filaments erect, ca. 1.3 mm long; anthers oblong, 0.3–0.4 mm long. Fruiting pedicels straight, 2.5–5 mm long. Fruits oblong, terete, 4–5.5 mm long, ca. 1.5 mm wide, obtuse at apex, glabrous; styles obsolete to 0.3 mm long; stigmas entire. Seeds (immature) 4 or 5 per locule, uniseriately arranged, ovate, ca. 1.2 mm long, 0.7 mm wide, brown; funicles filiform.

TYPE: Bolivia, Depto. La Paz, Murillo, near Palca, base of Illimani, 4800–5000 m alt., 25 Feb. 1979, *A. Ceballos, A. Charpin, J. Fernández Casas, & E. Valdés-Bermejo* 543 (holotype, G).

*Weberbaueria cymosa* is known only from the type collection. It is most closely related to *W. bracteata*, which it resembles in having ciliate, pinnatifid, rosulate basal leaves, ciliate, entire cauline leaves, oblong fruits with minute styles, and few, uniseriately arranged seeds. However, it is easily distinguished by its ebracteate, two- or three-flowered, cymelike, modified racemes, sessile cauline leaves, and smaller basal leaves. *Weberbaueria bracteata* has bracteate racemes, petiolate cauline leaves, and larger basal leaves.

*Weberbaueria cymosa* resembles *W. trichocarpa* in having highly modified, cymelike racemes, but the two appear to have little else in common. In fact, *W. cymosa* is probably a sister species of *W. bracteata*, whereas *W. trichocarpa* is closer to *W. spathulaefolia* than to any other species of the genus. It is most likely, therefore, that cymelike racemes evolved independently in those two species of *Weberbaueria*.

9. *Weberbaueria trichocarpa* (Muschler) J. F. Macbr. *Candollea* 5: 356. 1934.

*Eudema trichocarpum* Muschler, Bot. Jahrb. Syst. 40: 276. 1908. *Brayopsis trichocarpa* (Muschler) Gilg & Muschler, Bot. Jahrb. Syst. 42: 484. 1909. *Alpamina trichocarpa* (Muschler) O. E. Schulz, Pflanzenz. IV. 105 (Heft 86): 191. 1924. TYPE: Peru, above Lima, near Alpamina (as Alpamia in the original publication), 4500 m alt., 2 March 1904, A. *Weberbauer* 5119 (holotype, B).

Small, caespitose perennials, densely covered throughout with appressed, sessile, malpighiaceae trichomes 0.5–1.1 mm long, these oriented parallel to long axes of organs they cover. Caudices simple or branched, slender, usually covered with petiolar remains of previous years. Stems decumbent, rarely ascending or procumbent, unbranched, terete, (1–)2–4.5(–6) cm long. Basal leaves petiolate; blades linear to linear-lanceolate, (1–)2–4(–4.5) cm long, (1.5–)2–3.5 mm wide, acute, attenuate at base, entire, conduplicate or rarely flat, densely pubescent on both surfaces; petioles persistent, flattened, 5–10(–13) mm long, to 4 mm wide at base, somewhat membranaceous at margin. Cauline leaves short petiolate; blades ovate to lanceolate, 5–9(–11) mm long, 1.5–3(–3.5) mm wide, entire. Inflorescences cymelike, umbellate, usually 3-flowered racemes, often subtended at base by leafy bracts. Sepals caducous to persistent, erect, oblong, 3.5–4 mm long, 1.5–2 mm wide, obtuse at apex, nonsaccate, narrowly scarious at margin, densely pubescent on outside. Petals pink to pinkish-yellow, spatulate, 5–6.5 mm long, 1.5–2.2 mm wide, rounded at apex, attenuate to pubescent claw. Filaments white, erect, 3–4 mm long; anthers narrowly oblong, 0.8–1.1 mm long, minutely apiculate. Fruiting pedicels straight, (6–)7–15(–17) mm long, densely pubescent. Fruits oblong to linear, terete, straight, 7–13(–15) mm long, 1.7–2.4(–2.6) mm wide, obtuse at both ends; valves densely pubescent, with obscure midvein; septa hyaline; styles (0.4–)0.6–0.8(–1) mm long, glabrous. Seeds numerous, biserially arranged in each locule, oblong to ovate, 1–1.2 mm long, 0.6–0.7 mm wide, light to dark brown; funicles flattened proximally, filiform distally.

Endemic to Peru, where it grows on limestone slopes and cliffs at altitudes of 4200–4800 m.

REPRESENTATIVE SPECIMENS EXAMINED. **Peru.** DEPTO. ANCASH: Prov. Pallasca, Conchucós, *Weberbauer* 7229 (B, F, GH), 7229a (F, GH). DEPTO. LIMA: Río Blanco, *Macbride* 2990 (F, GH, MO, NY, US). DEPTO. PASCO: Cerro de Pasco, *Asplund* 11778 (s), 11835 (s), *Macbride* 3073 (CAS, F, GH, MO, NY, US).

*Weberbaueria trichocarpa* is readily distinguished from the other species of the genus by its dense covering of appressed, sessile, malpighiaceae trichomes on almost all parts of the plant (including sepals, outer portion of claws, and fruit valves) (see FIGURE 1a) and by its cymelike inflorescences. Submalpighiaceae trichomes are found on stems of *W. spathulaefolia*; cymelike racemes also characterize *W. cymosa*, and pubescent fruits occur in *W. retropila*. The presence of pubescent claws is restricted to *W. trichocarpa*. However, this character alone does not justify the separation of the species to a distinct genus, and some genera (e.g., *Sisymbrium*) of the Brassicaceae include species with glabrous petal claws and others with pubescent ones.

Perhaps the most remarkable feature of *Weberbaueria trichocarpa* and *W. cymosa* is the cymelike, modified raceme. To my knowledge, no other species of the Brassicaceae has this inflorescence type. The flowers and fruits in *W. trichocarpa* are typically arranged in threes, with one generally terminating the stem. Of the 216 inflorescences studied, this "dichasiumlike" raceme was observed in 112 (ca. 52 percent). Two-flowered inflorescences were found in 88 (ca. 41 percent) of the total, and most of these have a third abortive flower. Therefore, the basic inflorescence type for the species is a three-flowered raceme. One-, four-, and five-flowered inflorescences constitute the remaining seven percent. Variation in the number of flowers could be observed on various stems of a given plant. An example is found in *Macbride 2990* (MO).

#### 10. *Weberbaueria colchaguensis* (Barnéoud) Al-Shehbaz, comb. nov.

*Cardamine?* *colchaguensis* Barnéoud in C. Gay, Fl. Chile 1: 115. 1846. *Sisymbrium colchaguensis* (Barnéoud) Wedd. ex Fourn. Rech. Anat. Tax. Fam. Crucif. (Thesis, Paris), 134. 1865. *Hesperis colchaguensis* (Barnéoud) Kuntze, Revis. Gen. Pl. 2: 934. 1891. *Stenodraba colchaguensis* (Barnéoud) O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 11: 644. 1932. TYPE: Chile, [Región VII, Del Libertador General Bernardo O'Higgins,] Colchagua, cordillera del Cajón del Azufre, cerca del volcán de Talcaré-gue, 8000–9000 ft [ca. 2438–2743 m] alt., *Gay 171* (holotype, ♀, not seen; isotypes?, ♂(2 sheets)!).

*Erysimum?* *pusillum* Gillies ex Hooker & Arn. Bot. Misc. 3: 140. 1833, non *E. pusillum* Bory & Chaub. in Bory, Exp. Sci. Morée, Bot. 3(2): 190. 1832. *Braya pusilla* A. Gray, U. S. Expl. Exped. Phan. 15(1): 57. 1854. *Sisymbrium pusillum* Wedd. ex Fourn. Rech. Anat. Tax. Fam. Crucif. (Thesis, Paris), 131. 1865, non *S. pusillum* Villars, Fl. Delph. in Gilib. Syst. Pl. Europ. 1: 69. 1785. *Hesperis pusilla* Kuntze, Revis. Gen. Pl. 2: 935. 1891. *Weberbaueria pusilla* O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 194. 1924. *Stenodraba pusilla* Boelcke, Dansk. Bot. Ark. 22: 143. 1968. TYPE: Chile, el Cerro de la Porcura and la Cumbre de los Andes, 12,000 ft [ca. 3656 m] alt., *Gillies 8* (holotype, ♂! (photo, A!)).

*Draba andina* Philippi, Linnaea 28: 669. 1856. *Stenodraba andina* (Philippi) O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 187. 1924. TYPE: Chile, [Región VIII, Maule,] "in andibus prope oppidum Linares legit Germain" (holotype, ♂GO, not seen).

*Draba patagonica* Philippi, Linnaea 28: 669. 1856. *Stenodraba andina* (Philippi) O. E. Schulz var. *patagonica* (Philippi) O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 188. 1924. *Stenodraba patagonica* (Philippi) Ravenna, Nordic J. Bot. 1: 141. 1981. *Stenodraba pusilla* Boelcke var. *patagonica* (Philippi) Boelcke, Fl. Patagonica 4a: 530. 1984. TYPE: Chile, [Región XI, Los Lagos,] Volcani de Osorno, *Philippi s.n.*, March 1852 (holotype, ♂GO, not seen).

*Arabis drabaeformis* Schldl. Flora 39: 410. 1856. TYPE: Chile, [Región X, Araucanía,] Cordillera de Ranco, *Lechler 2958* (holotype, HAL; isotypes, ♂!, ♀!).

*Stenodraba andina* (Philippi) O. E. Schulz var. *hirticaulis* O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 188. 1924. TYPE: Chile, "Gipfel des Berges Pichiguan," 1852, *Philippi 67* (holotype, ♂!).

*Stenodraba andina* (Philippi) O. E. Schulz var. *stylosa* O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 188. 1924. TYPE: Chile, [Región X, Araucanía,] Volcán Lanín, 1800 m alt., *Neger s.n.*, April 1897 (holotype, ♂; isotypes, ♂(2 sheets)!).

Cespitose perennials. Caudices much branched, slender, the branches terminated in rosettes and covered at base with petioles of previous years. Stems subdecumbent to ascending or erect, simple or rarely branched, (1.5–)3–13(–

22) cm long, glabrous or pubescent with simple and/or rarely furcate trichomes. Basal leaves rosulate, short to long petiolate; blades oblanceolate to spatulate or obovate, rarely oblong, (5-)7-22(-25) mm long, 2-4.5(-6) mm wide, rounded at apex, cuneate to attenuate at base; entire to repand or dentate, rarely sinuately lobed, conspicuously ciliate with simple trichomes 0.6-1 mm long; petioles persistent, to 10 mm long, ciliate. Cauline leaves few, sessile; blades oblong to elliptic or obovate, (2-)4-8 mm long, 1-2.5 mm wide, ciliate and often densely pubescent with simple trichomes. Inflorescences ebracteate, corymbose racemes, rarely lowermost flowers bracteate; infructescences subumbellate or rarely elongated and to 4 cm long; rachises glabrous or pubescent. Sepals caducous, erect, oblong, 1.7-2.5 mm long, scarious at margin, glabrous to hispid. Petals white, sometimes with purplish patch on back, oblong-oblan-ceolate, 2-3.5 mm long, rounded at apex. Filaments 1.4-1.5 mm long; anthers 0.3-0.8 mm long. Fruiting pedicels erect and subappressed to rachis, very rarely divaricate-ascending, stout, straight, 1.5-4.5(-7) mm long, glabrous to pubescent. Fruits subsessile, oblong to linear, (4-)5-10(-13) mm long, 1.4-2(-2.2) mm wide; valves smooth, glabrous, with prominent midvein; septa hyaline; styles obsolete to 0.2(-0.6) mm long. Seeds 3 to 6 per locule, uniseriately to somewhat biseriately arranged, oblong to ovate, 1.1-1.4(-1.6) mm long, 0.6-0.8(-1) mm wide, dark brown; funicles slender throughout or somewhat expanded at placental end.

Growing on stony hillsides at altitudes of 900-3350 m.

REPRESENTATIVE SPECIMENS EXAMINED. **Argentina.** PROV. MENDOZA, Atuel Valley: near road to Volcán Orero, *Böcher, Hjerting, & Rahn 1872* (C); Laguna Atuel, *Böcher, Hjerting, & Rahn 1976* (C, MO); El Angulo, *Hjerting, Petersen, & Rahn 452* (C), *Böcher, Hjerting, & Rahn 1911* (C); Piedra del Burrero, Val Tordilla, *Wilczek 425* (G, 2 sheets); Cajón del Burro, *Wilczek 439* (G, US). PROV. NEUQUÉN: Pino Hachado, *Hauman s.n.*, Feb. 1920 (BA); Los Lagos, Filo Machete al Co. Rothleugal, *Dierre 929* (LIL). PROV. RÍO NEGRO: Cordón del Río Colorado, Cerro Gorra, *Moreau s.n.*, 19 Feb. 1940 (BA, 2 sheets); Cerro Dormilón, *Moreau s.n.*, 2 Feb. 1940 (BA); Parque Nac. Nahuel Huapi [PNNH], Cerro Rigi, *Pedersen 1599* (C), *Moreau s.n.*, 23 Jan. 1940, Feb. 1945 (BA, 3 sheets); PNNH, Co. Catcedral, *Moreau s.n.*, 4 March 1943 (BA, 2 sheets); PNNH, Hito Mirador, *Moreau s.n.*, 19 Feb. 1943 (BA); PNNH, Hito Millaqueo, *Moreau s.n.*, 20 Feb. 1943 (BA). **Chile.** [REGIÓN IV, COQUIMBO:] PROV. Choapa, La Vega Redonda, E of La Vega Escondida, *Morrison 16995* (DS, UC). [REGIÓN VII, DEL LIBERTADOR GENERAL BERNARDO O'HIGGINS:] PROV. Colchaqua, Las Damas, *Philippi 91b* (SGO); Valle Hermoso, *Philippi 91a* (SGO). [REGIÓN VIII, MAULE:] PROV. Curicó, El Valle de los Ciegos, near the volcano of Peteroa, *Bridges 1120* (BM, 2 sheets; E); PROV. Talca, Cordillera de Talca, *Philippi 91c* (SGO); PROV. Linares, Cordillera de Maule, *Germain s.n.*, 1856 & 1857 (BM; G, 2 sheets); Linares, *Philippi s.n.*, 1876 (B, F, G). [REGIÓN X, ARAUCANÍA:] PROV. Cautín, Villarrica, *Neger s.n.*, 1897 (M). [REGIÓN XI, LOS LAGOS:] PROV. Osorno, Paso Puyehue, *Sparre & Constance 10812* (UC). REGIÓN XII: Cerro Agudo, *Arroyo & Squeo 870116* (CONC).

Schulz (1924) misinterpreted the limits of *Weberbaueria colchaguensis* (as *pusilla*), because except for the type, all his other citations belong to *W. spathulifolia*. The type collection, however, is conspecific with the plants that Schulz recognized first (1924) as *Stenodraba andina* and later (1932) as *S. colcha-*

*guensis*. Boelcke (1968) was the first to reduce the last two names to the synonymy of *S. pusilla*, but as is shown below, he maintained *Stenodraba* as a distinct genus.

When published, *Erysimum pusillum* Gillies ex Hooker & Arn. was a later homonym of *E. pusillum* Bory & Chaub. According to Stafleu & Cowan (1976, 1979), the first and second homonyms were published in March 1833 and September 1832, respectively. Therefore, all combinations based on the former, including *Weberbaueria pusilla* (Gillies ex Hooker & Arn.) O. E. Schulz, are illegitimate and should be treated as new names based on the type of *Erysimum pusillum* Gillies ex Hooker & Arn., rather than as new combinations (see ICBN, Article 72). The earliest legitimate name for the species is *Cardamine colchaguensis* Barnéoud, and therefore a new combination based on that name is needed in *Weberbaueria*. Unaware of the fact that Gillies' name was a later homonym, Boelcke (1968) proposed the combination *Stenodraba pusilla* (Gillies ex Hooker & Arn.) Boelcke, but this name is illegitimate, and the species should be known in *Stenodraba* as *S. colchaguensis* (Barnéoud) O. E. Schulz.

*Weberbaueria colchaguensis* is variable in shape and margin of basal leaves, length of infructescences, pubescence of stems and leaves, and length and width of fruits. Plants with pubescent stems were recognized by Schulz (1924) as var. *hirticaulis*, and those with dentate leaves were treated as var. *patagonica* (as *Stenodraba andina*). However, plants with glabrescent or densely pubescent stems are found within the same population, while dentate and entire leaves are often found on the same plant. In my opinion, none of the numerous variants of the species deserves formal recognition because the variation usually occurs within populations and does not correlate with geography. The species has been reported to grow as far south into Patagonia as Prov. Santa Cruz. Although I have not seen any material from that area, I have used Boelcke's (1984) work as the basis for mapping the five southernmost localities of the species (see MAP 2).

Ravenna (1981, p. 141) argued that *Stenodraba andina* var. *patagonica* should be recognized as a distinct species, *S. patagonica* (Philippi) Ravenna, because it differs from *S. andina* in the "larger size of all parts of the plant," as well as in having "less flattened and more obtuse pods." These alleged differences are unrealistic, and *Weberbaueria colchaguensis* shows continuous variation in most parts, particularly the fruits. Boelcke (1984) reduced *S. patagonica* to a variety of *S. pusilla*, but his new combination was illegitimate for two reasons. First, he chose the illegitimate name *S. pusilla* instead of *S. colchaguensis* for the species. Second, his new combination was invalidly published because the basionym (*Draba patagonica* Philippi) and a full and direct reference to its author and place of valid publication were not given (see ICBN, Article 33.2).

*Weberbaueria colchaguensis* is distinguished by its slender, much-branched caudex, ciliate leaves, inconspicuous flowers with petals less than 3 mm long, subumbellate infructescences, stout fruiting pedicels usually less than 5 mm long, and short styles rarely to 0.6 mm. It is most closely related to *W. stenophylla* and *W. chillanensis*, from which it is distinguished by features listed under the latter species.

11. *Weberbaueria chillanensis* (Philippi) Al-Shehbaz, comb. nov.

*Draba chillanensis* Philippi, *Anales Univ. Chile* 2: 377. 1862. *Stenodraba chillanensis* (Philippi) O. E. Schulz, *Pflanzenr.* IV. 105 (Heft 86): 188. 1924. TYPE: Chile, [Región IX, Biobío; Prov. Ñuble,] Termas de Chillán, *Philippi s.n.* (SGO 49187 (photo, uc!)). *Stenodraba chillanensis* (Philippi) O. E. Schulz f. *laxa* O. E. Schulz, *Pflanzenr.* IV. 105 (Heft 86): 189. 1924. TYPE: Chile, [Región IX, Biobío,] valley of Nieblas, Termas de Chillán, *Philippi s.n.*, Jan. 1877 (as 1887) (b!, SGO!).

Cespitose perennials. Caudices multibranched, the branches slender, terminated in rosettes, covered with petiolar remains of previous years. Stems subdecumbent to ascending, (3)–6–14(–20) cm long, glabrous. Basal leaves rosulate, petiolate; blades spatulate to oblanceolate, sometimes linear-lanceolate, (5)–14–30(–40) mm long, (1)–2–3.5(–6) mm wide, obtuse to subacute at apex, attenuate at base, dentate, ciliate with simple and/or long-stalked furcate trichomes to 1 mm long. Cauline leaves few, linear-lanceolate, 7–15(–30) mm long, 1–1.5 mm wide, entire, ciliate. Inflorescences ebracteate, corymbose racemes, elongated in fruit. Sepals spreading, oblong to ovate, 2–2.6(–3) mm long, 1.2–1.5 mm wide, scarious at margin, glabrous or sparsely pubescent. Petals white, drying purplish in center, oblanceolate to spatulate, 2.5–3.5 mm long, 1.2–1.5 mm wide, rounded at apex, attenuate to clawlike base. Filaments somewhat spreading, 2.2–3 mm long; anthers oblong, 0.7–0.8 mm long. Fruiting pedicels divaricate-ascending, straight, (4)–6–11(–18) mm long, glabrous. Fruits divaricate-ascending, linear, flattened parallel to septum, nontorulose, straight, 9–19(–22) mm long, 1.5–1.8(–2.2) mm wide; valves glabrous, with prominent midvein; styles slender, 0.5–0.9(–1.1) mm long. Seeds uniseriately arranged in each locule, oblong, 1.4–1.6 mm long, 0.7–0.9(–1) mm wide, dark reddish-brown; funicles thickened at placental end.

REPRESENTATIVE SPECIMENS EXAMINED. **Argentina.** PROV. MENDOZA: Depto. Malargüe, Baños del Azufre, *Castellanos s.n.*, 19 Jan. 1941 (BA). **Chile.** [REGIÓN VIII, MAULE:] Prov. Curicó, Cajón del Azufre, *Albert s.n.*, Feb. 1891 (SGO); Cordillera Curicó, *Reiche s.n.* (B, CONC); Baños, *Vidal s.n.* (SGO); Volcán Peteroa, *Werdermann 604* (B, BM, E, F, G, GH, M, MO, NY, U, UC, Z); Prov. Talca, Cordillera Talca, Laguna de aguas calientes, *Philippi 1615a* (SGO); Prov. Linares, Thermae Longavi, *Schönemann 2277* (SGO). [REGIÓN IX, BIOBÍO:] Prov. Ñuble, Cordillera de Chillán, Termas de Chillán, *Jaffuel 3722* (GH), *Philippi s.n.*, Feb. 1892 (SGO).

*Weberbaueria chillanensis* is closely related to *W. colchaguensis* and *W. stenophylla*. All three have narrowly spatulate to oblanceolate, ciliate basal leaves, slender caudex branches each terminated by a rosette, persistent petioles, and ebracteate inflorescences. *Weberbaueria stenophylla* is easily distinguished by its entire basal leaves, elongate infructescences, large petals (3.5)–4–5 mm long, and styles 1.5–2 mm long. Both *W. chillanensis* and *W. colchaguensis* usually have dentate leaves, shorter petals (to 3.5 mm), and stout or slender styles rarely reaching 1 mm in length. *Weberbaueria chillanensis* is separated from *W. colchaguensis* in having conspicuously flattened fruits 9–19(–22) mm long, slender, divaricate-ascending fruiting pedicels usually more than 6 mm long, elongate infructescences, and slender styles 0.5–0.9(–1.1) mm long. In contrast, *W. colchaguensis* has subterete or slightly flattened fruits (4)–5–10(–13) mm



long, stout, erect fruiting pedicels almost always less than 6 mm, usually subumbellate infructescences, and obsolete or stout styles rarely to 0.6 mm. Furthermore, the occurrence of furcate trichomes on the leaves of *W. chillanensis* and their absence in *W. colchaguensis* and *W. stenophylla* is a useful diagnostic feature.

12. *Weberbaueria stenophylla* (Leyb.) Al-Shehbaz, comb. nov.

*Draba stenophylla* Leyb. *Anales Univ. Chile* **16**: 679. 1859. *Stenodraba stenophylla* (Leyb.) O. E. Schulz, *Pflanzenr.* **IV**, **105**(Heft 86): 189. 1924. TYPE: Chile, Cord. Santiago, Cerro Colorado, Mapocho Valley, 6000–7000 ft [ca. 1829–2134 m] alt., *Leybold s.n.*<sup>2</sup>

*Draba leyboldii* Philippi, *Linnaea* **33**: 10. 1864, non Dalla-Torre & Sarnth. *Stenodraba stenophylla* (Leyb.) O. E. Schulz var. *leyboldii* (Philippi) O. E. Schulz, *Pflanzenr.* **IV**, **105**(Heft 86): 190. 1924. TYPE: Chile, [Región IV, Coquimbo,] Cordillera Doña Rosa, *Volkman s.n.* (fragment, SGO!).

*Draba cauquenensis* Philippi, *Anales Univ. Chile* **81**: 330. 1893. TYPE: Chile, [Región VIII, Maule,] Hacienda de Cauquenes, Cajón del Arriero, *Dessauer s.n.* (lectotype (here designated), SGO!; isolectotypes, v!, m!).

Cespitose perennials. Caudices slender, much branched, the branches terminated in rosettes, covered with petiolar remains of previous years. Stems erect to subdecumbent, (3–)5–13 cm long, glabrous; basal leaves rosulate, petiolate; blades narrowly oblanceolate to rarely spatulate, (1–)1.5–4.5 cm long, (1–)1.5–2(–3) mm wide, subacute to rounded at apex, usually attenuate at base to conspicuous petiole, entire, ciliate with simple trichomes to 1 mm long. Cauline leaves few, subsessile; blades oblong-lanceolate, 4–10(–14) mm long, 1–1.5 mm wide, entire, usually ciliate. Inflorescences ebracteate, corymbose racemes, elongated in fruit. Sepals green to lavender, oblong, 2.5–3 mm long, 1–1.5 mm wide, scarious at margin, glabrous. Petals white, broadly obovate, (3.5–)4–5 mm long, 2–2.5 mm wide, clawed. Filaments white, linear, 2.5–4 mm long; anthers oblong, ca. 0.8 mm long. Fruiting pedicels slender, divaricate-ascending, 5–8(–10) mm long. Fruits oblong to linear, 7–12 mm long, ca. 1.5 mm wide, smooth, glabrous; styles slender, (0.8–)1.5–2 mm long; stigmas entire. Mature seeds not seen.

REPRESENTATIVE SPECIMENS EXAMINED: Chile, [REGIÓN VIII, MAULE,] Prov. Curicó, Andes de Curicó, *Vidal s.n.*, 1892 (SGO); El Valle de los Ciegos, near the volcano of Pteroa, *Bridges 1121* (BM, E, GH); Prov. Talca, Cordillera de Talca, *Reiche s.n.* (B); Turrieta, in Cordillera de Talca, *Philippi 1612* (SGO); Prov. Linares, Hacienda de Cauquenes, La Chapa, *Dessauer s.n.*, 1875 (M).

*Weberbaueria stenophylla* is apparently restricted to the three provinces of Región Maule, Chile. I have not seen any recent collections among the holdings of major herbaria. It is not known if the species has become extinct or is very rare and endangered. *Weberbaueria stenophylla* is easily distinguished from its closest relatives by characters listed under the preceding species.

<sup>2</sup>According to Stafleu & Cowan (1979), the types and herbarium of Friedrich Leybold, who settled in Chile in 1855, are unknown. However, if the type cannot be located, the detailed original description of the species is accompanied by a well-illustrated plate that should serve as the type.

13. *Weberbaueria lagunae* (O. E. Schulz) Al-Shehbaz, comb. et stat. nov.

*Stenodraba suffruticosa* (Barnéoud) O. E. Schulz var. *lagunae* O. E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 10: 469. 1928. TYPE: Chile, [Región III, Atacama, Prov. Huasco,] Vallenar, Cordillera Laguna Chica, ca. 4000 m alt., Jan. 1924, *Werdermann* 262 (holotype, B!; isotypes, BM!, CONC!, GH!, UC!).

Cespitose, scapose perennial. Caudices multibranching, the branches slender, terminated in rosettes, covered with persistent petiolar remains of previous years. Scapes leafless or rarely with small cauline leaf, slender, 2–5(–10) cm long, purplish, glabrous. Basal leaves rosulate, petiolate; blades narrowly oblanceolate to oblong-ob lanceolate, 4–10(–15) mm long, (0.5–)1–1.5 mm wide, rounded at apex, somewhat attenuate at base, entire, flat, glabrous beneath, densely ciliate and hispid above with unbranched trichomes to 1 mm long, midrib prominent; petioles persistent, thick, subterete, 1–5 mm long. Inflorescences ebracteate, few-flowered, corymbose racemes, elongated considerably in fruit. Sepals oblong, 1.5–2 mm long, 0.8–1 mm wide, nonsaccate, pubescent with straight trichomes. Petals yellowish white, with purplish area on back, oblong, 1.5–1.7 mm long, 0.4–0.8 mm wide, undifferentiated into blades and claws. Filaments 1.2–1.5 mm long; anthers oblong, 0.5–0.6 mm long. Fruiting pedicels divaricate to occasionally divaricate-ascending, slender, 4–8(–12) mm long, glabrous. Fruits linear, terete, torulose, 7–11 mm long, 0.9–1.2 mm wide, tapering at both ends, glabrous; septa hyaline; styles 0.3–0.4 mm long; stigmas entire. Seeds uniseriately arranged in each locule, oblong, 1.2–1.3 mm long, ca. 0.7 mm wide, brown; funicles thickened at placentar end.

Growing on dry rocky slopes and gravelly, sod-covered banks at altitudes of 3800–4000 m.

REPRESENTATIVE SPECIMENS EXAMINED. Chile. [REGIÓN III, ATACAMA:] Prov. Huasco, vicinity of Laguna Chica, *Johnston* 5950 (GH); vicinity of Laguna Valeriano, *Johnston* 6056 (CONC, GH, US).

Although *Weberbaueria lagunae* was originally described by Schulz (1928) as a variety of *Stenodraba suffruticosa* (now *W. suffruticosa*), it is so different in leaves, flowers, and fruits from both this and the closely related *W. imbricatifolia* that it should be recognized as a distinct species. *Weberbaueria lagunae* has narrowly oblong, nonclawed petals less than 2 mm long and styles 0.3–0.4 mm long in fruit. In contrast, both *W. imbricatifolia* and *W. suffruticosa* have clawed, broadly spatulate petals 3.5–5.5 mm long and styles 1–3 mm long in fruit. Furthermore, *W. lagunae* differs from *W. imbricatifolia* in having the lower leaf surface glabrous instead of pubescent, and from *W. suffruticosa* in having the leaves flat and oblanceolate instead of semiterete and linear.

*Weberbaueria lagunae* differs from the related *W. colchaguensis* in having lax, racemose infructescences, slender, divaricate fruiting pedicels 4–8(–12) mm long, torulose fruits, and entire basal leaves to 1.5 mm wide. *Weberbaueria colchaguensis* has dense, subumbellate infructescences, stout, subappressed fruiting pedicels 1.5–4.5(–6) mm long, smooth fruits, and usually dentate basal leaves 2–4.5(–6) mm wide.

14. *Weberbaueria suffruticosa* (Barnéoud) Al-Shehbaz, comb. nov.

*Draba suffruticosa* Barnéoud in C. Gay, Fl. Chile 1: 157. 1846. *Sisymbrium suffruticosum* (Barnéoud) Fourn. Rech. Anat. Tax. Fam. Crucif. (Thesis, Paris), 132. 1865. *Hesperis suffruticosa* (Barnéoud) Kuntze, Revis. Gen. Pl. 2: 935. 1891. *Draba imbricatifolia* Barnéoud var. *suffruticosa* (Barnéoud) Reiche, Fl. Chile 1: 116. 1896. *Stenodraba suffruticosa* (Barnéoud) O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 190. 1924. TYPE: Chile, [Región IV, Coquimbo,] Cordillera Ovalle, 12,000 ft [ca. 3658 m] alt., Gay s.n. (holotype, ♀; isotype, ♂ (photos, GH!, MO!)).

Cespitose, scapose perennial. Caudices branched, the branches slender, terminated in rosettes, covered with petiolar bases of previous years. Scapes leafless or rarely with 1 or 2 leaves, 3–5 cm long, glabrous. Basal leaves rosulate, petiolate; blades linear, thick, usually semiterete, (3–)4–8 mm long, 0.5–0.8 mm wide, the margin somewhat incurved, entire, ciliate, the lower surface glabrous, the upper surface usually densely hispid with simple trichomes to 1 mm long; midribs and petioles persistent. Inflorescences ebracteate, few-flowered racemes, elongated and lax in fruit. Sepals erect, oblong, 3.5–4 mm long, nonsaccate, scarious at margin, usually pubescent with straight, simple trichomes. Petals broadly spatulate, 4.5–5.5 mm long, ca. 1.5 mm wide, rounded at apex, attenuate to distinct, clawlike base. Filaments 3–3.5 mm long; anthers oblong, ca. 1 mm long. Fruiting pedicels divaricate, slender, (6–)8–12 mm long, glabrous. Fruits linear, subterete, somewhat torulose, 11–16 mm long, glabrous; septa hyaline; styles slender, (1.5–)2–3.1 mm long; stigmas entire. Seeds uniseriately arranged in each locule, oblong, ca. 1.5 mm long, 0.8 mm wide, brown; funicles somewhat stout at placental end.

REPRESENTATIVE SPECIMENS EXAMINED. Chile. [REGIÓN IV, COQUIMBO:] Prov. Limarí, Sotaquí, Gay 1029 (SGO); Cordillera de Doña Rosa, Volckmann s.n., 1860/1861 (SGO); Quebrada Larga, Jiles 3408 (CONC).

*Weberbaueria suffruticosa*, which is very rare and apparently known only from few collections, is easily distinguished from all other species of the genus by its semiterete, thick, linear basal leaves 0.5–0.8 mm wide. It also differs from its closest relative, *W. imbricatifolia*, in having a glabrous lower leaf surface. Both species have large flowers and slender styles to 3 mm long.

15. *Weberbaueria imbricatifolia* (Barnéoud) Al-Shehbaz, comb. nov.

*Draba imbricatifolia* Barnéoud in C. Gay, Fl. Chile 1: 158. 1846. *Braya imbricatifolia* (Barnéoud) A. Gray, U. S. Expl. Exped. Phan. 15(1): 58. 1854. *Sisymbrium imbricatifolium* (Barnéoud) Wedd. Chloris Andina 2: t. 58B. 1857. *Hesperis imbricatifolia* (Barnéoud) Kuntze, Revis. Gen. Pl. 2: 934. 1891. *Stenodraba imbricatifolia* (Barnéoud) O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 190. 1924. TYPE: Chile, [Región IV, Coquimbo,] Cordillera de Coquimbo, 12,000 ft [ca. 3658 m] alt., Gay s.n. (holotype, ♀; isotype, ♂ (photo, MO!); probable isotypes, G!, GH!). *Stenodraba imbricatifolia* (Barnéoud) O. E. Schulz var. *glabrata* O. E. Schulz, Pflanzenr. IV. 105(Heft 86): 190. 1924. TYPE: Chile, Leybold 2974 (holotype, ♂).

Cespitose, scapose perennial. Caudices woody, much branched, the branches terminated in rosettes, covered with persistent petiolar bases of previous years.

Scapes leafless or rarely with 1 or 2 cauline leaves, (0.6-)1-4(-6) cm long, glabrous. Basal leaves petiolate, flat; blades oblong to rarely oblanceolate, 2-7(-15) mm long, 0.5-1.5(-2) mm wide, rounded at apex, entire, ciliate, densely hispid above with simple trichomes to 1 mm long, pubescent below with much shorter, branched or rarely simple trichomes, very rarely glabrescent; petioles persistent, thick, 0.5-3(-5) mm long. Inflorescences few-flowered, ebracteate, corymbose racemes, elongated in fruit. Sepals erect, oblong, (2-)2.5-3.5 mm long, 1-1.5 mm wide, nonsaccate, scarious at margin, pubescent. Petals white, broadly spatulate, 3.5-5 mm long, 1.5-2 mm wide, rounded at apex, tapered to short claw. Filaments erect, 3-4 mm long; anthers oblong, ca. 1 mm long. Fruiting pedicels divaricate to ascending, slender, 3-7(-10) mm long, glabrous. Fruits linear, terete, somewhat torulose, (7-)9-14(-16) mm long, 1.2-1.5 mm wide, glabrous; septa hyaline; styles slender, 1-2(-3) mm long; stigmas entire. Seeds uniseriately arranged in each locule, oblong, ca. 1.2 mm long, 0.8 mm wide, brown.

REPRESENTATIVE SPECIMENS EXAMINED. **Chile.** [Región IV, COQUIMBO:] Prov. Choapa, Cordillera de Illapel, Vega Negra, *Volckmann s.n.*, 1860/1861 (SGO); La Polcura, *Philippi 2279* (SGO). [REGIÓN V, ACONCAGUA:] Prov. Petorca, 5 km S of Junta de Piuquenes, Río Sobrante, *Morrison 17290* (DS, UC). [REGIÓN VI, METROPOLITANA DE SANTIAGO:] Prov. Santiago, Andes of San José, *Gay 1028* (SGO).

*Weberbaueria imbricatifolia* is highly variable in the size and pubescence of the basal leaves. Schulz (1924) used the leafless scapes and short (2-4 mm) basal leaves of this species to distinguish it from *W. suffruticosa* (both as *Stenodraba*). *Weberbaueria suffruticosa* was said to have few cauline leaves and longer (6-8 mm) basal ones. The presence of cauline leaves is uncommon in both species, and different rosettes of the same plant might produce leafless stems, as well as stems with one or two leaves. Furthermore, the length of basal leaves is unreliable for the separation of these species (see descriptions). The shape, pubescence, and cross section of basal leaves provide the most reliable distinguishing characters: the leaves of *W. imbricatifolia* are flat, oblong to rarely oblanceolate, and almost always pubescent beneath with simple or furcate trichomes shorter than those of the upper surface; in contrast, those of *W. suffruticosa* are thick, semiterete, and linear, with a glabrous lower surface.

16. *Weberbaueria parvifolia* (Philippi) Al-Shchbaz, comb. nov.

*Sisymbrium parvifolium* Philippi, *Linnaea* 28: 667. 1856. *Stenodraba parvifolia* (Philippi) O. E. Schulz, *Pflanzenr.* IV. 105 (Heft 86): 187. 1924. TYPE: Chile, [Región VIII, Maule,] Cordillera de Linares, *Germain s.n.*, 1856 (holotype, SGO 63217!).

Cespitose perennials. Caudices slender, much branched, the branches terminated in rosettes. Stems erect or subdecumbent, simple or branched at base and/or above, 6-15(-25) cm long, glabrous or sparsely pubescent with furcate and/or dendritic trichomes. Basal leaves rosulate, short petiolate to subsessile; blades narrowly oblanceolate to rarely subovate, 5-20(-35) mm long, 1-2.5(-3.5) mm wide, obtuse to subacute, cuneate to attenuate at base, entire or rarely dentate, ciliate with simple trichomes, often with branched trichomes on surface, flat. Culine leaves few, smaller and narrower than basal ones. Inflores-

cences ebracteate, corymbose racemes, elongated in fruit. Sepals caducous, oblong, 1.5–2.6 mm long, 0.7–1 mm wide, glabrous or with dendritic trichomes. Petals white, oblanceolate, (1.8–)2.5–3.5 mm long, to ca. 1 mm wide. Filaments white, 1.7–2.8 mm long; anthers oblong, 0.6–0.8 mm long. Fruiting pedicels divaricate, straight, 4–10(–16) mm long, usually glabrous. Fruits linear, flattened, not torulose, 8–18(–24) mm long, 0.8–1.2(–1.5) mm wide; valves glabrous, with conspicuous midvein; styles 0.1–0.4(–0.7) mm long; stigmas entire. Seeds uniseriately arranged, oblong-ovate, 1.2–1.6 mm long, 0.7–0.9 mm wide, brown; cotyledons incumbent; funicles somewhat thickened at proximal end.

REPRESENTATIVE SPECIMENS EXAMINED. **Argentina.** PROV. NEUQUÉN: Depto. Lacar, Chapelco, *Schajovskoy 61* (BAA); Depto. Chos Malal, cajón del ao. del Cruce, *Boelcke, Correa, Bacigalupo, et al. 11279* (BAA); Depto. Minas, confluence of rivers Pichi-Neuquén and Neuquén, *Boelcke et al. 13763* (BAA); upper valley of ao. Atrouco, *Boelcke, Correa, Bacigalupo, et al. 11512* (BAA), *11533* (BAA, si); Cordillera del Viento, cruzada de Tricao Malal al Cajón de Butaló, *Boelcke, Correa, Bacigalupo, et al. 11565* (BAA, si); Cajón de los Chenques, *Boelcke et al. 13847* (BAA); N of Varvarco Campos, *Boelcke et al. 14144* (BAA); Depto. Picunches, Pino Hachado, *Burkart 9738* (si); Lago Aluminé, *Kalela 1608* (H). **Chile.** [REGIÓN VII, DEL LIBERTADOR GENERAL BERNARDO O'HIGGINS:] PROV. Colchagua, San Fernando, Termas El Falco, *Montero 6043* (si). [REGIÓN VIII, MAULE:] Cordillera de Maule, *Germain s.n.*, 1856–1857 (G); Prov. Talca, Cordillera de Talca, El Picazo, *Barros 2752* (si).

*Weberbaueria parvifolia* is somewhat anomalous in the genus in having sometimes erect stems that are branched above. No other species of *Weberbaueria* has this feature. However, *W. parvifolia* is related to other species of the genus that Schulz (1924) placed in *Stenodraba*.

#### ACKNOWLEDGMENTS

I am most thankful to Reed C. Rollins and Neil A. Harriman for their critical reviews of the manuscript, and to Donald H. Pfister for obtaining funds from the Harvard University Herbaria that supported the SEM portion of the research. I am grateful to Elizabeth A. Shaw and Peter F. Stevens for correcting the Latin diagnoses, Gustavo A. Romero for helping with Spanish, Michael A. Canoso for obtaining the loans, Barbara Nimblett for typing the manuscript, Trisha Rice for the SEM work, my wife, Mona, for her continuous support, and Elizabeth B. Schmidt and Stephen A. Spongberg for their editorial advice. I am indebted to Stephan G. Beck, Clodomiro Marticorena, Barbara Ruthsatz, David N. Smith, and James C. Solomon for sending plant material. I thank the directors and curators of the herbaria (abbreviations follow Holmgren *et al.*, 1981), who kindly loaned the specimens on which this study is based.

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